Six Manufacturers Accept GSA's Tough New Policies

WASHINGTON, D.C. – The federal government has apparently won the first round in its attempt to get better terms from computer manufacturers. Six computer companies (see box) already have signed on the dotted line. The agreements were hailed by Commissioner H.A. Abersfeller of the General Services Administration as "a major step forward" when he talked to *Computerworld* after his agency had decided to accept the offers.

The offers included the full new warranty clause (CW, July 10) under which the responsibility of the supplier is much greater than previously. Everything he states in writing (including literature on the system) effectively becomes part of the purchase order and of the contract.

This year Abersfeller has a much stronger hand in negotiating with the companies because it is now

Companies which have agreed to the new GSA terms are:
Control Data Corp. Honeywell Inc. National Cash Register Philco-Ford Scientific Data Systems Systems Engineering Laboratories

known that the GSA has exclusive computer procurement responsibility for the federal government. There had been some

doubt about this, as phraseology in the Brooks' Bill was open to other interpretations, but after examining the records of Congress and the bill itself, the controller-general agreed with the GSA interpretation.

Details of the contracts were not available at press time, but it was learned that they covered single, main frame systems only, so that multiple system purchases will have to be separately negotiated. No major direct price reductions in the single main frame areas are included.

H.A. Abersfeller, leader of the government team in the current negotiations with computer manufacturers.

CW Stock Index Closes Up 8.17%

Computerworld's Computer Stock Index continued the upward trend of the previous two weeks, closing up 5.7% July 5 at 151.42, while the Dow Jones industrial average reversed a three week downward trend, closing up 6.36% at 903.51. Among the computer stocks, gainers outnumbered losers by almost two-to-one.

The market was open for three consecutive days during the trading week, the first time in many weeks, and the market's surprising burst July 3 rekindled some hopes that the sputtering summer rally might get off the ground after all.

However, the stock market in general was further away from breaking through its 1967 high of

Be on the Lookout for Soggy Checks!

WASHINGTON, D.C. – Soggy looking checks are a tip-off to Federal Reserve System clerks that the checks are being repeatedly processed through high speed sorting equipment without being returned to the banks against which they are drawn. Such loops develop because the checks are MICR-encoded with incorrect transit numbers.

A ricocheting check can be used

as an instrument of fraud since the depositing bank would pay out the check once the normal time for presentation and return had passed, but long before the check itself would be spotted in the normal way.

A ricocheting check occurs when the MICR-encoded transit number in the upper right hand corner applies to no bank in the Federal Reserve district in which

it is being sorted.

When it is rejected by the high speed sorting equipment and subsequently sorted visually, it is sent to the "proper" Federal Reserve district. There, the high speed sorting equipment sends it back, since that is what the encoding calls for, and the loop is repeated until the error is caught by hand.

To prevent ricocheting, checks being sent from the high speed sorting operation to the low speed sorting operation because they are payable in another district are inspected to determine if the printed fractional symbol and transit number correspond to the MICR-encoded symbol and transit number.

Clerks are also warned to watch for checks that have become soggy because the ink from repeated endorsement stamps has seeped through to the front.

OS Compatibility Committee Forming

Can operating system control languages possibly be standardized? If so, how? These questions will be considered by an ad hoc committee being formed within the U.S.A. Standards Institute as a result of recent publicity about the compatibility problems

caused by the lack of standardization. Committee members will be expected to give about three man days a month in effort and travel time.

For details contact M. Perstein, SDC Corp., 2500 Colorado Ave., Santa Monica, Calif. 90406.

DEC Offers New Models, Cuts Prices

MAYNARD, Mass. – Reduced price versions of the PDP 8/I and PDP 9 systems have been announced by Digital Equipment Corp. Named the 8/L and 9/L respectively, the first deliveries will be made in October. Both systems are program compatible with their respective predecessors and are aimed at the $200 million computer market in the education, research, instrumentation, and numerical control industries.

Other news of PDP systems includes a series of price reductions on additional memory for the PDP 8/I systems, and the publication of lease terms for PDP 8/S and 8/I computers by Applied Data Research, of Princeton, N.J.

The smaller of the two new systems is the 8/L, which can have either 4K or 8K 12-bit words, with a 1.6 microsecond cycle. The basic price of the 4K version, including a Teletype, is $8500. This compares with a price of $12,800 for the 8/I, which, however, can be expanded up to 32K words.

The other new system is the PDP 9/L, which has 4K to 32K 18-bit, 1.5 microsecond cycle words and eight data channels. A new Compact Software System, consisting of assembler, debugging routines, editor, math package, and utility programs will be provided.

Digital Equipment's new PDP-8/L computer, foreground, and PDP-9/L computer, rear.

First 360/95 Systems Go To NASA

WASHINGTON, D.C. – The first two IBM 360/95s – super fast systems with a million bytes of thin film memory and four million bytes of core memory – have been accepted by NASA's Goddard Space Flight Center.

The two are the only ones in the Model 90 series equipped with the ultra high speed, thin film memories. Information is stored on magnetic spots four millionths of an inch thick. With an access time of 67 nanoseconds, these are the fastest, large scale memories in user operation, IBM said.

One Model 95 serves as the primary data processing facility for the center's Tracking and Data Systems Directorate. It provides additional computing support to the project, technology, and systems reliability directorates.

Universe Simulated

The other is being used by astrophysicists to create mathematical models of the universe and to simulate the evolution of galaxies, stars, and planets.

The speed of the thin film memories gives the Model 95s a performance edge – up to twice as fast on certain problems – over the Model 91, the first super speed computer in the Model 90 series. IBM's initial Model 91 was placed in operation earlier this year by NASA-Goddard.

120 Nanosecond Cycle

New circuit and packaging techniques are used with the unique memory array to achieve the fast – 120 nanosecond – cycle time.

Each system is equipped with 16 thin film memory units. The data width, at which information is transferred to the processor, is eight bytes.

The core memory has a cycle time of 750 nanoseconds. The memory combination gives the Model 95 more than twice the storage capacity of the Model 91.

Billion Byte Storage

The system has auxiliary storage of about one billion bytes. It consists of disk, drum, and data cell devices.

The Model 90 series was initiated by IBM as a program to advance the state of computer art and to serve a limited number of sophisticated data processing users. With its program objectives met and all deliveries now scheduled over the next 12 months, IBM has stopped accepting orders on the series, the company said.

The Kodak KOM-90 Microfilmer, which can record up to 500 pages of computer output in one minute, is manufactured for Kodak by Cubic Corp.

Microfilmer Unit Converts Computer Tape to Images

SAN DIEGO, Calif. — Production of the new Kodak KOM-90 Microfilmer, which accepts magnetic tape and converts it to a microfilmed form equivalent to computer printouts, has been started in the Cubic Co. facilities here. The unit is due for first delivery later this year.

The KOM-90 uses magnetic tapes produced by special programs on a user's computer. These programs substitute for those normally used to lay out computer printer output. Some standard programs will be provided by Eastman-Kodak for use on System 360 computers.

More Type Styles

The appearance of the final form is quite different from the appearance of the equivalent high speed printer page, as bold face and italic print can be used on all systems, and, optionally, lower case and customer defined characters can be added to the 61 character set. Interchangeable form overlay slides also provide a better overall appearance.

Printer Skip Compatibility

The raw data can be accepted in ASCII, extended, or 6-bit BCD, or variations thereof. Compatibility with line printers using skip channel control is provided by the use of 9-channel skipping; and, in addition, tab characters (up to eight positions are allowed) can be inserted to reduce output time on the computer, or to increase throughput on the microfilmer.

After the microfilm is produced, it can be stored and retrieved and displayed by other Kodak systems. Indexing for two retrieval coding methods (Image Control and Code Line Indexing) is standard.

Air Force Orders CDC Computers

HANSCOM FIELD, Mass. — Control Data Corp. has been chosen to furnish and install two 6600 computers as replacements at the Air Proving Ground Center, Eglin AFB, Fla., the Electronic Systems Division, Air Force Systems Command, has announced.

The 6600 computers will replace IBM 7094-II and 1401 systems.

Five Year Contract

The procurement covers a five year time span beginning next January for the first increment, which will cost $136,327 per month. The second increment, to start in December 1969, will increase the cost to $236,316 per month.

Evaluation of the porposals was made by a source selection board at the Electronic Systems Division.

The new equipment will be used for data reduction, simulation, program development, and other services in support of the Air Proving Ground Center.

First Keytape Units Shipped; 28 New Models Announced

CHICAGO, Ill. — Brunswick Corp. will receive the first production models of the Honeywell Keytape data inscribers. The two units are to be tested in the Brunswick Data Center here, it was announced by Brunswick and Honeywell's Electronic Data Processing Division.

The units will be used for payroll, order processing, accounts receivable, manufacturing control, inventory control, and accounting information systems. After the initial testing, Keytape units will be sent to Brunswick divisions which have Honeywell computer installations.

The units were shipped recently from the Lawrence, Mass., manufacturing plant.

"A continual quest for methods of providing fast, accurate information has caused the company to move into the area of document conversion. The key objective is to capture data as close to the point of origin as possible," said Victor Woldridge, director of Brunswick's information systems.

"Keytape's engineering excellence suggests it will meet our intense demands for both speed and dependability," Woldridge added.

Honeywell claims the Keytape can increase data preparation production an average of 35% over keypunch machines and increase data input to a computer system from 300 to 1000%. Keytape units transcribe data directly onto computer ready, magnetic tape through a keypunch-like keyboard.

A family of eight Keytape units was introduced by Honeywell in January, and, it was announced recently, 28 additional models have been added to the family to greatly increase the machine's capabilities and versatility.

Keytape units now may be linked directly to any Series 200 computer system over standard communication lines through a new control unit.

The current volume is beyond the company's most optimistic expectations, Honeywell said, and shipping schedules have been advanced one month ahead of the original schedule. Production for the rest of the year has been increased to meet a rapidly rising order demand.

"The addition of these 28 new Keytape models greatly increases the flexibility and versatility of the units by combining multiple capabilities with the basic data transcription function," said Myron A. Angier, director of the special products division, Honeywell Electronic Data Processing Division.

Three new models in both the K-700 series for 7-channel tape and the K-900 series for 9-channel tape provide an adding machine for off-line balancing of batches of data, a line printer for off-line printing of data from any magnetic tape file, and a check digit function for verification of account numbers and other similar checking.

Previously announced models in both series of Keytape include a communicator for Keytape-to-Keytape data transmission, a card reader for punched card to tape data conversion, and a pooler for consolidating short-run tapes onto one master tape.

The additional 22 new models — 11 in each series — combine two of the six secondary capabilities for greater versatility and flexibility of each Keytape unit.

An operator loads computer tape on a Honeywell Keytape data inscriber.

For Data Management

Military to Test Time Sharing System

ANDREWS AIR FORCE BASE, Md. — An experimental data management system, operated under time-shared conditions, was demonstrated last week to defense officials. Called Adept-50, it was designed by Systems Development Corp. (SDC) under a contract from the Advanced Research Projects Agency of the Defense Department, and is currently being installed for test and evaluation at the National Military Command System Support Center and at the Air Force Command Post.

For the demonstration, a teletypewriter connection was made to SDC headquarters in Santa Monica, Calif.

Adept-50 is composed of three separate components:

1) A large scale, time sharing control system, or executive, that allows multiple users on a variety of terminals to simultaneously exchange information with the central computer. Each user receives instantaneous response and needs no programming or computer experience. Users can work independently, each having the feeling that he has sole use of the computer, or can work together on a problem, sharing the same store of data in the computer. The executive is equipped with file security measures that prevent unauthorized access to restricted files and prevent accidental damage of data or programs.

2) A data management system which allows users, without sophisticated knowledge of programming, to have complete control in manipulating large amounts of data and complex programs in the computer. The user can request selected portions of data be printed on his terminal or on other output devices for analysis. He can ask questions, change values, perform arithmetic operations, and combine or rearrange groups of data. He receives only the information he really needs, at the time he needs it, and in the form most usable in answering his question.

3) A programmers' package that permits construction and debugging of programs. Using a terminal, the programmer can construct, modify, delete, or insert programs or parts of programs. Having a direct and immediate link with the computer allows him to "see" his program developing and to experiment with various alternatives.

Working from terminals that are connected to a centrally located computer, Adept-50 gives many users complete freedom in manipulating, retrieving, updating, and storing data.

A military base commander, for example, by using a terminal to a central computer, could get immediate response to questions about the training and readiness of forces or of the logistics of men and materials. At the same time the computer would be available to other base personnel for simulation, computations, document retrieval, personnel records, statistics, and other management information needs.

Prices of IBM 360/20s Corrected

WHITE PLAINS, N.Y. — In a June 26 *Computerworld* story on the new models 3 and 4 of the IBM 360/20, some of the prices given were listed for the wrong systems. The correct table is shown below:

	Submodel 4 (low cost)	Submodel 2 (original)	New Model 20s
8K	$22,700 (505/mo.)	$36,080 (800/mo.)	$ 45,600 (900/mo.)
12K	29,800 (665/mo.)	47,720 (1,060/mo.)	58,000 (1160/mo.)
16K	36,700 (825/mo.)	58,590 (1,315/mo.)	72,800 (1415/mo.)
24K	NA	NA	91,700 (1765/mo.)
32K	NA	NA	107,800 (2115/mo.)

Privacy Calls for More Than a Figleaf

WASHINGTON, D.C. — The records of the second Long Senate committee hearings on computer privacy were published last week — and contained both pleasant and unpleasant surprises even for those who attended.

The pleasant discovery was the inclusion of a short paper, by a Boston attorney who did not appear, which presented the stark statement that present law neither had nor could evolve any privacy protection "worth more than a figleaf," and went on to give three simple rules for what protection was needed.

The unpleasant surprise was the United Planning Organization Trust Deed as actually adopted after the hearings. Wiley Branton,

The Miller privacy recommendations, reprinted below, are designed to provide for effective individual privacy, while allowing technological progress. *Computerworld* regards them as being important both as a guideline for systems analysts in their design of systems, and as a basis for discussion and possible action. Comments on them will be welcome.

First: Any government agency or private individual or firm which gathers personal data from several sources for the purpose of distributing that data to third parties should be required to:

(a) Give notice to individuals that such data is being collected about them.

(b) Afford access to the data for the purpose of verification.

Second: Public authorities should not be authorized to purchase or use equipment for the purpose of storing and distributing personal data to third parties unless a satisfactory plan is filed with the highest administrative authority in the agency or with a board reporting to him, disclosing the agency's program for the protection of the privacy of individuals. It is expected that standards would gradually be created and adopted appropriate to agency operations and hardware.

Third: Agencies and firms, and their employees, engaged in the business of gathering and distributing personal data, should be liable to injured parties for the dissemination of false data or the knowing transmission of true data for defamatory purposes.

executive director of the organization, had discussed the draft in the hearings — and had heard his approach lauded as being a potential landmark by the chairman, Sen. Edward V. Long. However, in the final form the two key provisions — the routine destruction of data after 10 years, and the exclusion from the records of data liable to be misused — had both been dropped. As one commentator said, "They extracted the two teeth — and left an emasculated version that can just gum things up."
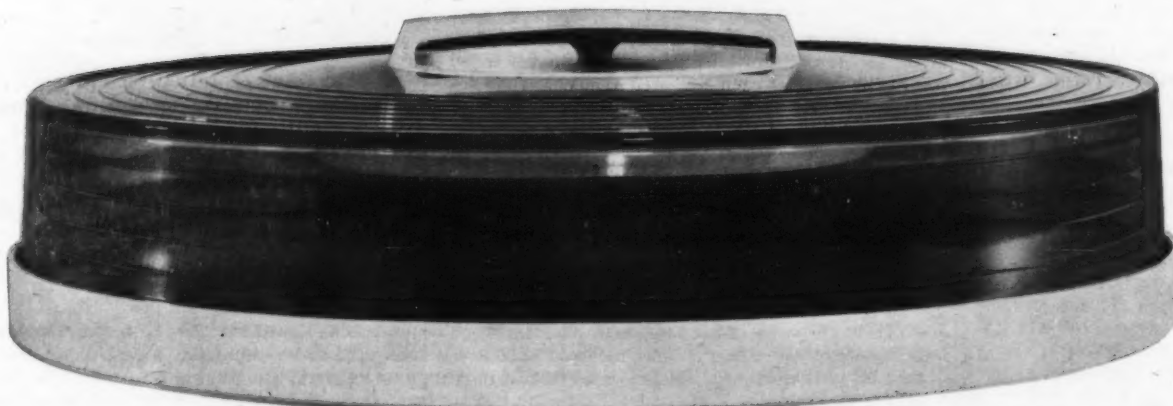
The surprise paper was by Richard Miller of Harbridge House. Unlike Prof. Alan Westin of Columbia University, who relied on a wide interpretation of the first amendment and basically argued that the right to privacy was already enshrined in the U.S. Constitution, Miller argued that the present law has been concerned with the method of collection of data, rather than with its use. As a result, he said, there was no real chance that either the case law, or the current trends in statute laws (which he considers contradictory to each other) could be adequately targeted to produce the appropriate result.

His recommendations include the establishment of a statutary right of notice of, and access to, all personal data files by the people concerned; control of public authority use of any hardware for storing and/or distributing such information; and the establishment of liability to injured parties whenever anyone disseminates false information, or true information for known defamatory purposes.

Copies of the hearing records can be obtained from the Subcommittee on Administrative Practice and Procedure of the Senate Judiciary Committee, or from the Government Printing Office.

New Service to Analyze Bond Investments

ATLANTA, Ga. — A new time sharing system for solving bond investment problems in a matter of minutes ha. been initiated by the Investment Services Department of the Trust Co. of Georgia.

The bank is the first in the Southeast to offer the new service, called BID (Bond Investment Data). It purchased the BID program from the State Street Bank and Trust Co., Boston.

The system provides essential data to enable banks to determine the dollar effect of a proposed bond trade in advance, taking into account tax considerations.

Although the new service is available only to banks at the present time, plans are underway to offer the service to savings and loan associations and insurance companies.

Second Vice President James B. Carson, Jr., investment services manager, said that the service could provide before-tax and after-tax yields on old and proposed securities; before-tax and after-tax gains or losses; net tax effects; increase in annual income due to exchange; years to recover from loss, if a loss is realized; and other figures relevant to bank portfolio planning.

William H. Dameron of the Investment Services Department said that an IBM 2741 terminal in the bank is hooked to an IBM 7040 computer in Philadelphia.

Editorials

Welcome! Welcome!

The 1699 new holders of the Certificate of Data Processing are a very valuable addition to our community. They have completed and passed a stringent examination which may not, perhaps, be testing exactly what they will need in the field but which certainly tests their steadfast study of the field.

Critics of the CDP often are inclined to overlook the fact that few examinations in the academic world really test the abilities that are most valuable in later life. In the same way that the study of Greek poetry taught a discipline which was itself valuable, examinations often have a value far beyond their contents.

No matter, the CDP holder has taken the stiffest examination open to him in the field. He has passed, and the field is richer for his presence.

Honi soit qui mal y pense!

'Thank You'

This is a "thank you" to four responsible executives in the business of supplying computer users with some of their wants. They have presented their products strongly through their advertisements, brochures, and news releases.

However, the products as presented at first were described a bit too strongly. A specification which has once been found valid, although not further tested, was "guaranteed." A timing which was possible on one single occasion was described as being possible continuously. An "average" was described as being a "minimum." Little things — such as figures, although valid in themselves, had been represented as meaning something else.

Computerworld questioned these points while preparing the news for our readers and sought an explanation. The four people to whom this is addressed also sought, within their organizations, an explanation. They found it — and then withdrew the claim.

Computerworld salutes the many responsible executives we do not know about — and thanks the four that we do.

Measure for Measure

How Does the 70/35 Rate Against the IBM 360/25?

Claim

The RCA claim is that the "RCA Spectra 70/35 gives you twice the processor power of a 360/25 . . . for the same cost."

Investigation

First we asked RCA for its justification of the claim and were referred to the specifications and the price lists of the two machines. RCA provided us with the specifications for the Spectra 70/35, and we obtained the equivalent specifications for the 360/25 from IBM.

Using these specifications, we then compared the instruction-by-instruction timings of the two machines. (RCA publishes an "operations/second" comparison in its literature, but this does not show the actual timings, nor does it represent an adequate sample of the instruction set, so we disregarded it.) The specifications showed that in general the published times for the two machines were in fact different, and *that the RCA system was faster by the 2-1 ratio quoted.* All nonprivileged instructions where this was not true are listed on the right.

We then considered the words "processor power." This is not a term which has ever been officially defined in the industry, but is generally considered to mean effective computational capability. We were now satisfied that the arithmetic unit itself had the necessary power. But the question was whether or not some system details made it impractical to utilize the power, so invalidating the claim.

One of the normal design details which sometimes holds the processing power below its apparent level is the inability to get the correct core sizes. The Model 25 is available in core sizes of 16, 24, 32, and 49K. The Spectra 70/35 is available in sizes of 32, 49, and 65K. Systems of 16K and 24K are not available.

Another area which sometimes limits the usefulness of raw processing power are the input/output capabilities. The input/output characteristics of the IBM Model 25 include integrated attachment features for some specific input/output equipment, plus a single multiplexer or a single selector channel. On the 360/25 the data rate varies from 2.2KB to 27KB on the multiplexer channel, and 10KB to 30KB on the selector channel. On the Spectra 70/35 the multiplexer channel rates are from 31KB to 61.5KB in multiplexed mode, or 417KB in burst mode. The selector channels (two selectors can be supplied) have a rate of 694KB each.

The fastest integrated units on the 360/25 are the four disk drives, which have a data transfer rate — 156KB — well above the rates acceptable on the ordinary channels. The Spectra 70/35 does not have the integrated unit facilities but can accommodate disk drives on either of the selector channels.

From this it looked as though there would be no limitation on the basic power of the Spectra 70/35 through the design of the input/output or through the lack of integrated input/output units. However, no Spectra 70/35s are offered which are equivalent to the small core IBM 360/25s.

We checked out the prices for the two cases where both systems have parallel hardware. The prices

have recently been changed – downward – and now the 32K and the 49K systems rent for the same amount a month, although the rental terms are different. IBM charges a 10% extra shift charge, whereas RCA gives unlimited use. Purchase prices, however, still differ, with RCA being more expensive than IBM.

Computerworld Verdict

Computerworld believes that the claim "the RCA Spectra 70/35 gives you twice the processor power of a 360/25 . . . for the same price," is substantially correct. The processing power of the Spectra 70/35 is twice that of the 360/25, and is not inhibited by input/output or other arrangements. However, the use of rental instead of purchase figures, and the absence of some models on the Spectra line which are present on the IBM line make it potentially misleading, and in need of clarification in advertising and company literature.

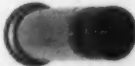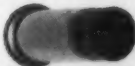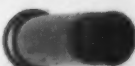**ANALYSIS OF RATIOS BETWEEN THE RCA 70/35 AND IBM 360/25 INSTRUCTION TIMES**

Type of Instruction	Number of instructions under 2.0 ratio	Number of instructions equalling or greater than 2.0 ratio
Fixed Point	6	29
Decimal	1	8
Logical	5	28
Branch	0	9
Floating Point	4	40
TOTAL	16	114

Instructions that did not achieve 2.0 ratio

Fixed Point	Ratio
Convert to decimal	1.7
Load Negative	1.9
Load Positive	1.9
Shift Left Double	1.3
Shift Right Double	1.3
Store Word	1.8

Decimal Arithmetic	
Zero and Add	1.8

Logical Instructions	
Compare Logical RX	1.5
Exclusive OR RX	1.4
Load Address	1.3
Shift Left Double Logical	1.3
Shift Right Double Logical	1.3

Floating Point Instructions	
Divide Long (RX & RR)	1.4
Divide Short (RX & RR)	1.4

Viewpoint

Telex Rates Unit's Up-Time Over Maintainability

TULSA, Okla. — "There's more in keeping tape drives in the field than just maintainability," said James MacGuire, marketing vice president of Telex Corp., who believes that his company currently has more plug-for-plug compatible tape drives in the field than any other. He was apparently referring to the article (CW, May 8) in which Luther A. Schwalm, president of MAI (which has similar drives in the field) emphasized the prime role of maintenance in the market. (Telex previously produced and marketed its drives under the name "Midwestern.")

Up-Time Decisive

"I feel this way: Even if you provide the best possible service, and you have the easiest drive around from a maintenance angle, the fact that the drive simply *must* remain in operation is the key factor."

To make his point, he cited an installation which is pounding out data 24 hours a day, 365 days a year. In this case he felt that amount of up-time, rather than the ease of coming back up, is the criterion. "You could be short of some parts for a casting, and then the whole computer could be tied up. You could put your best CE there, and you could have the easiest drive to maintain, but if all your forecasting didn't jell towards that installation you would have serious problems."

As well as overall control, actual field experience is also important. But there are problems in measuring it, said MacGuire, who referred us to the engineering department for details. Here the engineers pointed out that IBM does not release figures for its Mean Time Between Failures (MTBF) which leaves them unable to directly compare the performance of the competitive drives. Moreover, as they pointed out, they have to maintain strict compatibility so that, for instance, a fast start time might be of no interest to a user because of the requirement to keep the same gap lengths.

"But, we, have many indications of the fact that our drives are giving better performance in fact, so it is not only the cost savings that can be decisive," was their comment. To back this up they showed the output of some diagnostic routines showing the actual gap lengths. On these printouts it appeared that the Telex drives were staying closer to the nominal gap length on tape than were the IBM ones, and so providing a user with more data storage per tape.

New Factory Extension

As might be expected when an executive expresses such opinions, MacGuire had something to back them up. In this case it was a newly extended factory which produces his tape units, and which is part of his own operation. Here they make the castings, do the wiring, manufacture the heads, and assemble and test the product under one roof. A 35,000 square foot extension had just been opened a few weeks before and computers were being installed to test the drives operationally before they are shipped.

MacGuire admitted that quality control had been a problem during the past year and that the company had had some difficulties with units going out inadequately tested. He felt, however, that the use of the IBM 360 and 1401 systems in the testing area in conjunction with other operations would ensure adequate controls in the future.

He felt that the ability to change the design of the system to meet field conditions was a great plus in Telex's operations. Citing the design of nine track heads, he pointed out that they were equipped to adjust the design if head wear appeared to be a problem, more than they would be if they were purchasing the drives from outside suppliers.

He also pointed out that Telex Corp. was not associated with Western Union. "We allow them to use our name, provided they always use it directly in conjunction with the phrase 'Western Union.' Actually we are a diversified magnetic tape product manufacturer. We claim to be the most diversified one in the business. We make home entertainment and commercial tape recorders, two types of cartridge recorders, and private label systems for such retailers as Sears.

James MacGuire, Telex marketing vice president, discusses his views with Alan Taylor, *Computerworld* editor, in MacGuire's Tulsa, Okla., office.

MacGuire, right, shows Taylor the Telex tape drive production line.

Letters to the Editor

Sicsoc Proposed

To the Editor:

On behalf of a group of members of the Association for Computing Machinery, I am submitting a petition to the Council of the Association to consider the establishment of a Special Interest Committee for Social Science Computing (Sicsoc). The use of computers by social scientists is rapidly increasing in universities, government, and business, and yet there does not now exist an organization whose scope is sufficiently broad to appeal to a substantial number of these individuals. We propose Sicsoc as an organization that would attempt to focus upon our common interest of the use of computers in the social sciences.

Examples of areas the committee might concern itself with are (1) statistical programming, (2) statistical systems, (3) social science procedural languages, (4) information retrieval in the social sciences, (5) simulation of social models and social systems, and (6) the application of computers to public policy formation. These examples indicate some topics of current interest, and are not intended to exhaust areas of potential committee activity.

Our present conception of the committee's functions is that it serve as an exploratory device to ascertain the most appropriate domain of interest for such a group and to determine the viability of the group as a productive association of individuals. As an

initial action, we anticipate holding an organizational meeting at the forthcoming ACM Conference in Las Vegas. Two immediate purposes of this meeting would be (1) to begin a search for a qualified, well-known social scientist who would be interested in heading a more formalized group, and (2) establishing informal channels of communication (probably a newsletter) between interested individuals.

Readers of *Computerworld* who are interested in participating in the committee's activities are encouraged to write me.

George Sadowsky, Director
Computer Center
Brookings Institute
Washington, D.C.

EDPeople

IS NOW	AT	WAS	AT
E.W. Buckley	Manager Technical Services	Univac Blue Bell, Pa.	Regional Manager Staff Services	Univac New York
Robert D. McInnis	Marketing Manager	Digital Equipment Maynard, Mass.	District Manager	Electronic Associates, Inc.
Richard A. Hagberg	Vice President	Computer Sciences Leasing Co.	Financial Executive	Litton Industries, Inc.
William R. Rave	Vice President Field Support	Field Engineering Div. IBM White Plains, N.Y.	Director Field Support	IBM White Plains, N.Y.
John D. Moran	Vice President	Management Data Corp.	Asst. Vice President	Industrial Valley Bank & Trust Co.
Albert E. Cookson	General Technical Director	ITT New York	General Manager	ITT Intelcom, Inc. Va.
A.M. Bretschger	Comptroller	FMC Chemical Div.	Director Information Services Chemical Div.	FMC
Paul M. Pair	Senior Staff Consultant	Control Data Corp.	Director	Illinois Business Education Association
Samuel C. Johnson	Director Marketing	TLW Computer Div. Atlanta, Ga.	President	Electrosystems Memphis, Tenn.
Maj. Gen. Joseph C. Cody, Jr.	Commander	AF Electronic Systems Div. Hanscom Field	Chief of Staff	AF Systems Command Andrews AFB
James B. Bockian	Principal Consultant Eastern Region	McDonnell Automation East Orange, N.J.	Director Applications Development	Data Network Corp. New York

E.W. Buckley   R.D. McInnis   R.A. Hagberg   W.R. Rave   J.D. Moran

Honolulu Police Install System to Aid Crime Fighting

The Honolulu Police Department has installed an IBM System/360 Model 50 to aid in the war against crime. In addition, the computer is helping the Honolulu Motor Vehicle Department prepare automobile registration forms. The system utilizes six IBM 2260 display stations and will be supplemented by three additional 2260 units, three 2740s and six 1052s by July of this year. Chief of Police Daniel Liu said it is permitting better utilization of the department's manpower.

The University of Western Ontario has installed a digital PDP-10/50 time-sharing computer system. The PDP-10/50 will initially have 12 terminals, will be expanded by late 1968 to about 30 terminals, and eventually will include several card reader-printers.

The General Post Office of Great Britain has ordered a Burroughs B5500 on-line computer system to be installed this summer in GPO's Telecommunications headquarters in Gresham Street, London. It will be linked to four centers in that metropolis. Nine terminals will provide instant computer facilities for the four city activities. Use of the terminals will provide instant printed replies to instructions in each of the offices or for the computer's line printer to produce output at the Gresham Street headquarters. Software will include a desk calculator language, remote compilation facilities, and a program library maintenance.

The Alabama Board of Corrections, Montgomery, Ala., has installed a Univac 9200 computer to keep complete statistics on prisoners and for general account-

Orders and Installations

ing purposes. The installation was at Kilby Prison.

New leases totaling $1,696,000 for IBM System/360 computers and IBM peripheral equipment have been closed in the past six weeks by Lectro Computer Leasing Corp., New York, according to Jerold Nabridge, president.

The Chrysler Corp., Florida operations, recently installed two SDS Sigma 2 computer systems.

Cyril Lord Ltd., Rathgael, Ireland, carpet manufacturer, has ordered a Honeywell Model 1200 computer system. Installation is scheduled for September. The

computer will figure the cutting of various sized rugs to reduce wastage of odd-sized remnants.

Quinnipiac College, Hamden, Conn., has ordered a Univac 9300 for handling the college's business and record applications and for use by students. The computer will be supplied with three magnetic tape units, a card punch machine, and a high speed printer. The system replaces a 120 currently in use at the college.

Crown Agents, London, England, have ordered a Honeywell 1250 computer system to be installed at the Sutton office. It will be linked by communications equipment to the firm's headquarters and shipping office in London. The heart of the communications network will be a series of terminals in the London offices. A keyboard attached to the terminals will order data from the computer and the data will be displayed on a CRT. The network will also include teletypewriters.

Fabri-Tek, Inc. has shipped its first memory system in a contract with Sylvania Electrical Products to supply systems for automatic car identification systems. The system's scanning device makes possible instantaneous location of any freight car in America and is an adaptation of the memory technology developed for the new Model 470 series. It incorporates various conversion features that can store data on up to 10 trains of average length, for later transmittal on command to a central computer unit.

New RCA Plant

RCA's new $12 million manufacturing plant in Marlboro, Mass. was designed to permit the three different functions — administration, engineering, and assembly — to be located on separate floors and each to have direct access to grade. The plant, to be used for the engineering and production of computer peripheral equipment, will be completed next April.

WASHINGTON, D.C. — A number of major marketing moves in its eastern regional area were announced by Lee Johnson, president of Comress, Inc. The New York office will move from 80 Wall St. to larger quarters at 1120 Ave. of the Americas. Edward J. Clark has been appointed director of marketing for the middle Atlantic and eastern regions, and will operate out of the Philadelphia office. A Boston office has been opened at 220 Boylston St., Chestnut Hill, Mass.

The marketing manager will be Thomas J. Leffingwell. Marketing manager of the Pittsburgh office will be Robert J. Hartig.

Expansions

New Infotec Building

RYE, N.Y. — Infotec, Inc. has occupied a new structure at 70 Newtown Rd., Plainville, N.Y. The new engineering facilities will house the company's tape and data stations. The new plant is under the direction of C.R. Conklin, vice president of engineering. Systems applications and software division will remain at the main office, 22 Purchase St., Rye.

Essex Forms Division

NEW YORK — Essex Systems Co. will expand its operations by forming a second division, Essex Computer Supplies and Services, according to Leonard Clark, president. The new division will market magnetic tapes, disk packs, and computer ribbons. Macey A. Levy has been appointed vice president-operations and will be in charge of the new computer supplies and services division.

Boothe Subsidiary

SAN FRANCISCO, Calif. — Boothe Computer Corp. has announced the formation of a wholly owned subsidiary corporation to engage in equity financing of smaller corporations in the computer industry and to provide lease programs for manufacturers of computer peripheral equipment and related devices. The subsidiary has been named Boothe Computer Investment Corp. B.J. Brooks has been named manager. The new subsidiary will be headquartered in the Alcoa Building, San Francisco.
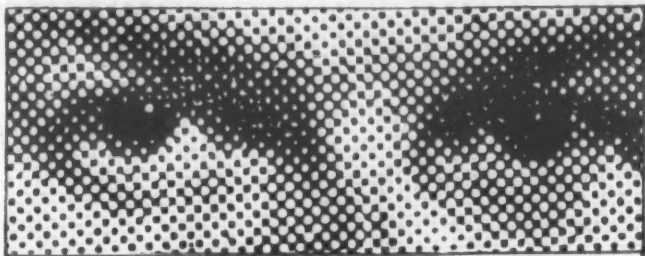
Randolph Opens Office

NEW YORK — Randolph Computer Corporation has opened a midwest regional office in Cincinnati, John M. Randolph, president, announced. The regional office will be managed by Frederick C. Lohrum who will be responsible for computer leasing marketing in the Midwest. Offices are located at 1425 McMillan St.

Office Opened

MOUNTAIN VIEW, Calif. — Anderson Jacobson, Inc. has opened an eastern regional office at 72 County Rd., Tenafly, N.J. The new office will support sales effort with customer service and applications engineering. Local agents will be appointed.

AMA Plans Show On Education Uses

NEW YORK — With the complex problems of training workers and developing corporate executives now rivaling those of educating youngsters and producing scholars, the American Management Association's Education and Training Equipment Exposition and Conference in August is expected to receive wide attention.

The show, with about 150 companies demonstrating thousands of new types of educational hardware, software, and services, will be 50% larger than last year's exposition — an indication of the rapid growth and interest in the technology of education and training.

On exhibit will be computers, computer programs, and computer assisted instruction, as well as audio-visual equipment.

The keynote address, "The Role of Congress in Assuring Effective Education of the Ghetto Child," will be delivered by Sen. Wayne Morse, chairman of the education subcommittee of the Senate Labor and Public Welfare Committee. Sen. Gale McGee will be luncheon speaker with an address on "Education for a Better America."

Other luncheon speakers will be Martin Stone, chairman and president of Monogram Industries, Inc., Los Angeles, on "The Social Responsibility of the Business Community," and Dr. James M. Nabrit, president, Howard University, Washington, D.C., on "The Negro, Higher Education and the White Community."

Among the topics for discussion for educators will be the systems approach to education, the computer in education, and individually prescribed instruction.

For those in business and industry, topics will include training managers in computer technology.

For groups of both educators and business executives, the discussions will include use of gaming and simulation.

Conference registration inquiries should be directed to Conference Registrar, American Management Assn., 135 W. 50th St., New York, N.Y. 10020.

Computer Tests Pupils, Reports Their Progress

SUSSEX, Eng. — In cooperation with a school here, International Computers and Tabulators Ltd. is starting a computer assisted testing project to help the school's pupils in their studies. The project will be run parallel to the school's use of programmed learning textbooks. It will remotely link between four and six interrogating visual display units to one of the ICT's computer installations.

The basis of this project began with ICT developed, on-line computer teaching facilities for testing. ICT's Educational Research Department prepared draft proposals for a similar but more detailed on-line project for the Thomas Bennett Comprehensive School in Crawley. This experimental project is due to go live at the end of this year.

The Crawley school has been preparing programmed learning texts for biology under the auspices of the Nuffield Foundation's "Resources for Learning Project." Some 330 pupils, aged between 11 and 12, are learning their biology in this manner.

This computer based Adaptive Testing System will be used to aid the testing, guiding, and scheduling of the pupils as individuals, thus improving the overall system of programmed learning. The system will become an integral part of the programmed learning of biology in the school.

In operation the system will test the pupils as they progress through each stage of learning. A conventional lesson, the study of a programmed text, watching a film, or carrying out a practical experiment in the laboratory may all have been part of the conventional learning process. Then when the student is satisfied that he has learned a particular stage of biology studies, he will use an interrogating visual display unit to test himself.

Having typed in his name and number on the keyboard, the pupil is greeted with a personal "hello" on the display. The computer knows what stage that student has reached and therefore selects the appropriate stage of questions to ask the pupil. These are displayed on the CRT and the child replies by typing in the answer. Although the answers require only a few words or a short sentence, the phraseology of each child may be different. However, the computer can select the key words from the reply and detect whether the answer is correct or not.

If the answers are correct, the child will be told to study for the next stage. If the answer is incorrect, the computer will be able to ask the pupil what his answers were to the main points in his programmed text. Gradually, by this process the computer will be able to discover where the pupil went wrong, then depending on how the teacher wishes the program to run, the computer will either explain to the child where he went wrong and retest him, or tell him to see the teacher.

One of the most important features of the system is that a record file will be maintained in the computer. From this the teacher will be able to tell how his pupils are progressing, which of them are learning quickly and which ones are having difficulty. In this way the teacher will be able to devote more individual attention to the slower children.

It is important to emphasize that the computer does not replace the teacher, but that it enables him to distribute his time more appropriately to those pupils who need it.

Although the subject of biology has been chosen for this project, it is virtually a random choice.

Adaptive testing systems including the biology teaching project will be demonstrated at the IFIP 68 Congress in Edinburgh.
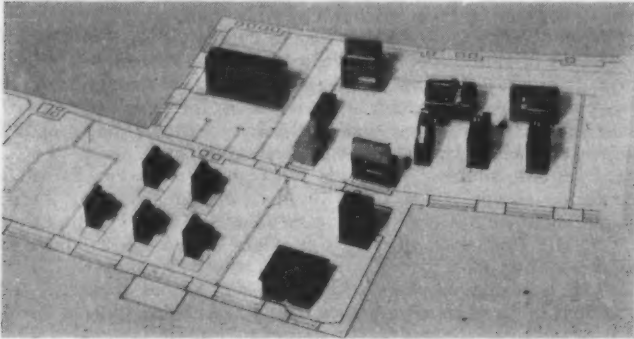
Mini-Models Help Lay Out EDP Rooms,

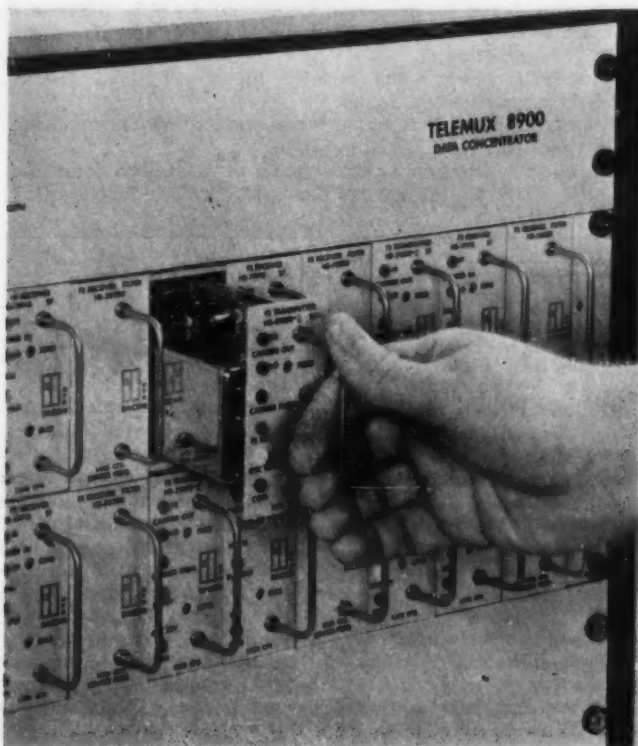Mini-models for three dimensional data processing area planning, priced from $1.50, are hand crafted from thick wall Lucite in colors and scaled 1/4" to one foot. A floor plan layout sheet is available. Computer Model Co., P.O. Box 267, Saxonville, Mass.

Data Concentrator

A new data concentrator, the

Computer Room Mini-Model

Dacom Data Concentrator

Model 8900, concentrates data from a number of terminals such as teleprinters and paper tape readers and transmits it over a single voice-grade line. The unit, priced from $8500, interfaces all commercial teleprinter, paper tape stations, visual displays, and other similar terminal devices. Dacom Division, Computer Test Corp., Cherry Hill, N.J.
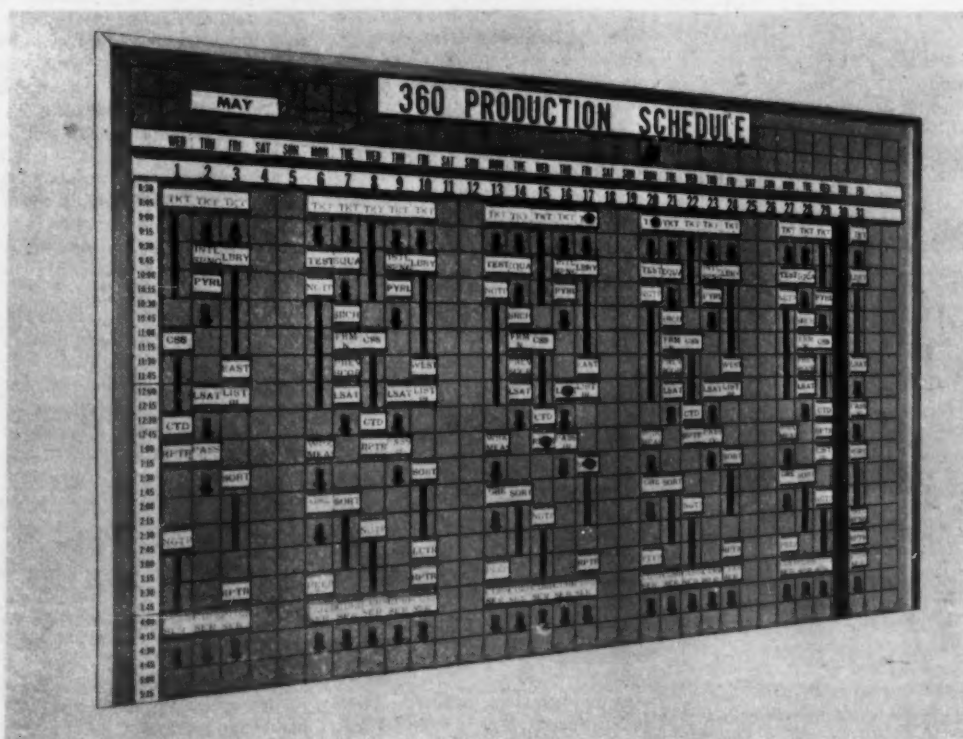
Scheduling Board

A new computer scheduling board equipped with magnets is available in 20 styles for scheduling computers for 30 days, every 15, or every 6 minutes. Empty blocks on the magnetic board indicate idle time. Edward Ochman Systems, Box 141, Fairfield, Conn.

Memory

A new coincident-current memory designed for data storage in computers and other digital systems, the VersaStore III, is furnished fully wired for its highest storage capacity. Expansion is obtained by plugging in a large core stack and additional data cards. Operation is asynchronous at a full cycle of 1.0 microseconds and provides half cycle operation at 600 nanoseconds. Access time is 450 nanoseconds. Integrated circuit constructions, address options, data and address register displays, and auto addressing for expansion up to 16K are included. Varian Data Machines, 2722 Michelson Drive, Irvine, Calif. 92664.

Badge Reader

A new 10 x 10 badge reader features rear mounted connectors for simplified installation. The connectors, mounted on a shelf bracket at the rear of the reader, are of a type widely used in conventional systems. Card feed is manual and contact probing of cards is solenoid operated. Programming Devices Division, Sealectro Corp., 225 Hoyt St., Mamaroneck, N.Y. 10543.

EDP Ribbon

A new ribbon for high speed printers that is reported to last considerably longer than conventionally inked fabric ribbons has been introduced by Columbia Ribbon & Carbon Mfg. Co., Inc. The Marathon Controlled Release Ribbon, of synthetic fabric, is impregnated with ink containing metallic particles which serve to monitor the flow when the type characters strike the ribbon. Columbia Ribbon & Carbon Mfg. Co., Inc., Glen Cove, N.Y.

Phototypesetter

The 713-70 Textmaster, at $55,000, is the newest addition to the Photon 713 series of phototypesetters. The machine holds up to 36 fonts at a time, from 5 to 18 points, and will set line lengths up to 45 picas. The 713-70 can produce 200 newspaper lines a minute in common straight-matter applications, the manufacturer claims. While often used in conjunction with a computer, the phototypesetter can also be dri-

ven directly by keyboard produced tape. Photon, Inc., Wilmington, Mass. 01887.
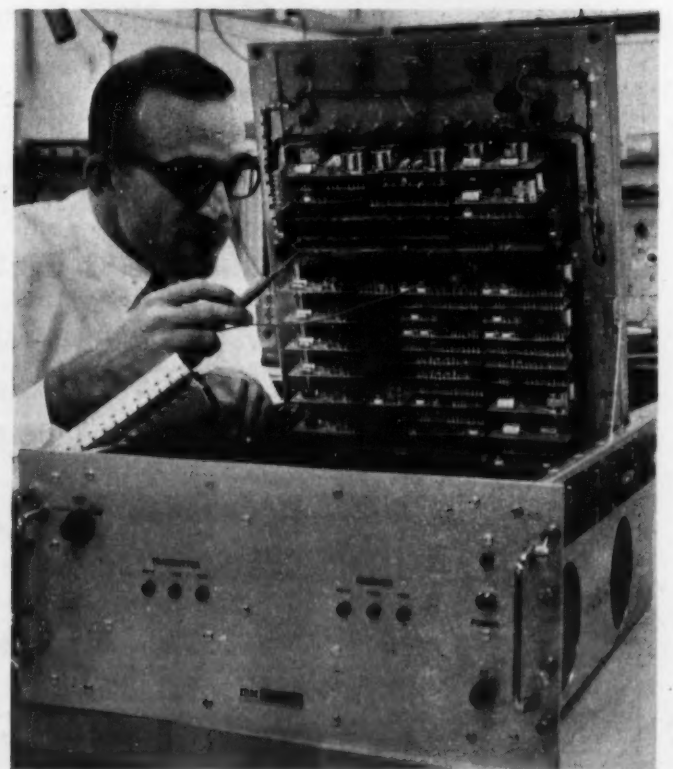
Digital Modem

A digital modem that operates on C1/C2 grade telephone lines at 4800 and 7200 bits/second has been developed by IBM's Federal Systems Division. Both speeds are available in one unit equipped with a speed selector switch. The modem can be equalized with built-in automatic gain control. Primary power is 50 watts with nominal input of 105-125 volts AC, 50-60 Hz, single phase. IBM, Federal Systems Division, 18100 Frederick Pike, Gaithersburg, Md. 20760.

Mounting Hardware

Mounting hardware to aid system designers using digital logic modules has been designed to eliminate the mechanical and electrical interconnection problems that occur in assembling a digital system. The hardware includes system cabinets, swing frames for module mounting cases, and power supplies. Scientific Data Systems, 1649 17th St., Santa Monica, Calif. 90404.

Sealectro Badge Reader

Ochman Systems Scheduling Board
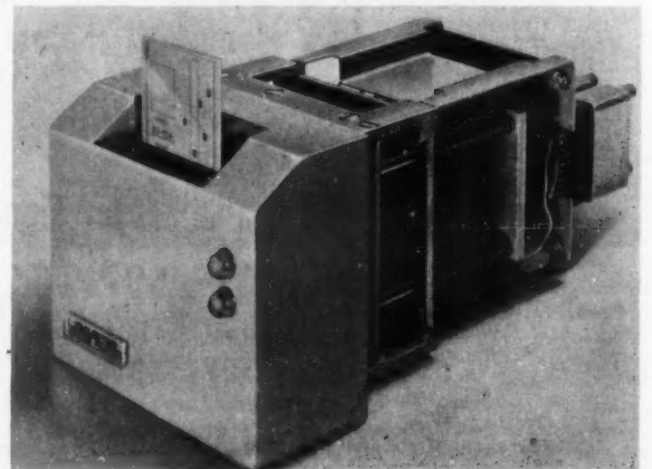
IBM Two-Speed Digital Modem

Tests Spot Diseases With Computer's Aid

BIRMINGHAM, Ala. — A new approach to medicine developed here frequently detects diseases years before the patient would normally feel the symptoms — and often makes possible treatment that keeps the ailment from worsening.

Dr. Albert E. Casey, pathologist at Birmingham Baptist Hospitals, uses as a diagnostic tool a battery of up to 76 tests run on just one blood sample and other specimens taken from a patient.

The tests are processed in the laboratory on complex, multi-channel AutoAnalyzers. Then the test data is sent by telephone lines to a Univac 1004. It calculates the test results, analyzes them, and prints its diagnosis of the patient's health on a special consultation sheet. This goes to Dr. Casey for his comments, then to the patient's own physician.

Test packages of this type reveal that at least three patients in every 10 who enter the two Baptist institutions unknowingly have an additional disease or organic malfunction at such an early stage of development that symptoms are not yet evident.

For example, a heart condition was detected in one patient about to undergo surgery, and the operation was postponed. Yet, this minor heart condition was insufficiently developed to be confirmed by the usual electrocardiogram — although it was later.

In another case, early cancer was found in a patient who took 28 of the tests simply as part of his annual physical examination. Here again, an initial series of X-rays and further tests did not bear out the computer diagnosis. But additional tests finally confirmed that the patient had cancer.

"These tests can be summed up as time, money, and life savers," declared one of Dr. Casey's colleagues. Said another of Casey, "He's a genius, and he's setting a pattern for the practice of medicine that will be as common 10 or 15 years from now as urinalysis and hemoglobin are to the annual physical examination everywhere else right now."

Cuts Cost

This new technique is economically feasible only through automation. By linking the automated lab analysers to card and tape punching devices, data transmission equipment, and, ultimately, to the Univac 1004 card processor, Dr. Casey has dramatically reduced the time and cost required per test.

Physicians have traditionally used laboratory tests primarily to confirm their own diagnosis of a patient's condition based upon certain symptoms the patient has — symptoms which may well indicate a disease in its later stages. Laboratory tests by conventional methods have been too slow and expensive to be applied otherwise.

Now Dr. Casey's laboratories can perform the 76-test package for less than the cost of one day's stay in the hospital. Within a year, he expects to expand the package to 100 tests. By contrast, many hospitals still charge about $7 a test.

This testing technique is expected to become as common as are chest X-rays and "pap" tests today, but with much more far reaching results.

"Our goal is broad implementation of this test package for large segments of the population," said Dr. Casey. "This will be preventive medicine in its truest sense. It will be a significant contribution to health care, since prevention or early detection of disease will always be more successful than treatment of the disease at advanced stages.

"This is particularly true of slow developing diseases such as gout, arthritis, or diabetes," he said. "If we catch one of these early, we can often arrest it, and prevent complications — in the case of diabetes, for example, prevent damage to the kidneys and blood vessels."

Preschool Project

A battery of these tests has been completed on 2700 Jefferson County, Ala., children of preschool age, under a project sponsored by the Federal Head Start Program. The Birmingham Baptist Hospitals loaned an Auto-Analyzer for the project and the results are being interpreted on the Univac 1004 by Dr. Casey.

Using such a large group of children in a project of this particular type might well be a national first, according to Dr. Carey Phillips, Birmingham pediatrician who coordinated the local effort.

"If we could gather enough of the necessary kind of material for these tests to come up with an ideal screening program for preschoolers, we might be able to find diseases before they would ordinarily show up in the children," said Dr. Phillips.
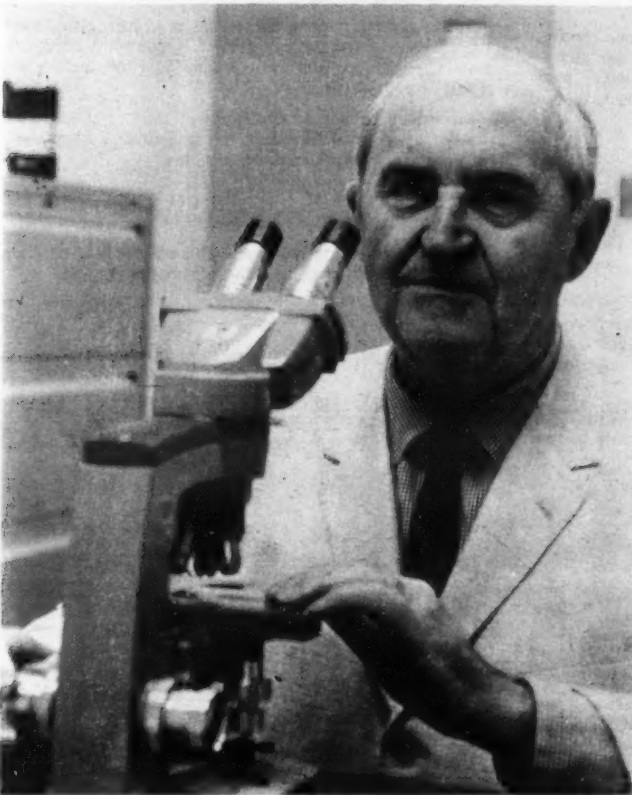
For individual patients, in addition to the saving in actual tests costs, Dr. Casey's approach offers considerable savings in hospital expense and time, in most cases. One 30cc blood specimen from a patient is generally all that is required for the many blood tests and the diagnoses, which are based on automated comparison of the test values with factual data from nearly 4000 patient records.

By getting the wide range of test results quickly — many within a few minutes — the length of stay of the average patient is reduced. The results of one or two tests no longer create the need for one or two more, as has been the case.

Finally, catching the disease in its early stages reduces or even eliminates the later longer trip to the hospital that might have been necessary if the disease had gone undetected for years.

Dr. Casey believes that "automation is really just getting started in the laboratory."

"Hospital laboratories are going to undergo tremendous changes," he declared. "Standard benches, sinks, Bunson burners and the like will be as outmoded as the Model-T Ford. In their place will be banks of automatic testing equipment operated by a medical technologist trained both to understand and perform the various tests, and make the equipment perform as it is designed to."

G. Stephen Thrasher, left, chief medical technologist; Charles R. Ratliff, center, chief of clinical chemistry; and Phillip Warren, a medical technologist, discuss the results of a test.

Dr. Albert E. Casey, laboratory director at Birmingham Baptist Hospitals.

Prospector Trades in Pack Mule for Computer

TUCSON, Ariz. — A modern prospector is using a pair of computers in a shopping center here to search for copper, lead, silver, and gold around the world.

The glass-front offices of Richard F. Hewlett, mining consultant, attract little attention from shoppers visiting the Casas Adobes Center.

Hewlett makes determinations that literally can move mountains. His preparation of computer analyses may result in the explosion of tons of dynamite on a mountain in Peru, in bringing to life a mining ghost town in New Mexico, or in expanding a gold mine in South Africa. Hewlett and his associates are asked by both U.S. and foreign mining companies to help determine whether a potential mine will be profitable or whether an existing mine is worth expansion. His work ranges from ore reserve estimation to property evaluation, mine design and production scheduling to process control.

"What we do, in effect, is recreate the land formation and potential mine — in our computers — in three dimensions," Hewlett said. "We develop a mathematical model from all available data gathered from historical records, test drillings, instrument analyses, and aerial surveys at the exploration site. With the data we can help determine if an area will be worth mining in relation to the enormous actual costs that would be involved."

Financial analysis programs guide the computer as it weighs the many factors involved in a successful mining venture. An area may have rich ore deposits, but drilling, haulage, equipment, or the costs of removing the overburden may prove the find to be of relatively little value.

Once the geophysical information has been reduced to numerical form, the computer also can manipulate the data to provide automatically plotted charts and graphs for on-site personnel.

"With increasing costs and lower ore grades, mining companies are being forced to examine ventures far more carefully," Hewlett said. "More exact information is vital, and the computer enables us to extract it from available data."

Hewlett, 33, is completing his work on a Ph.D. from the Colorado School of Mines. His interest in the application of computers to mining led to his master's degree thesis on this subject at the University of Arizona in 1960.

Hewlett employs 20 people, including three mining engineers, six programmers, three systems analysts, and five operators. The firm uses two IBM 1130 systems.

Richard F. Hewlett, right, discusses ore samples with a staff member at his Tucson office.

British Society Releases New Exam

LONDON — The British Computer Society, which recently decided to upgrade itself and insist on examination-qualified membership, published its first examination schedule recently. The schedule covers Part I of the "Professional Qualifications" and allows people who have two years of approved experience and the equivalent of a high school diploma to qualify to take the second (and final) part of the examinations.

Exam Contents

The Part I examination consists of two general papers, taking three hours each, and a choice of six out of 10 questions. The candidate also can select two specialist areas — such as data processing, programming, information processing systems, computer technology fundamentals, computational methods, and analog and hybrid techniques. While the details of Part II are not known, the general scheme is for a candidate either to submit a thesis dissertation on advanced, original work, or to take a written examination or an oral examination.

U.S. Situation

The overall effect will be wider than that of any equivalent operation in the United States except for the various university examinations in computer science. The DPMA's "Certificate of Data Processing" examination does not really provide the same width.

The syllabuses below are for some optional examinations required for Part I of the Membership of the British Computer Society. The examination on each option (two of which have to be taken) lasts for three hours, and a choice of six out of ten questions is given.

OPTION A

Fundamentals of computer technology

1. *Computer circuit techniques:* types of signals and methods of signal generation and handling in digital computing machinery: characteristics and performance of gates, staticisers, inverters and other logic elements. The half and full adder, registers, counters and timing chains: serial to parallel and parallel to serial conversion; parity checking.

2. *Combinational logic:* logical connectives and operators.

Boolean expressions; minimization of Boolean expressions by algebraic, graphical and tabular methods. Construction of function tables and their realization in computer logic.

3. *Storage techniques:* types of store, erasable, volatile, dynamic. Destructive and non-destructive read-out. Arrangement and construction of storage devices. Backing stores. Considerations of access and cycle time.

4. *Computer organization:* the movement of data through the computer system; data input, input buffering, store input, store access, arithmetic processing, store output, output buffering, data output. Overall program control, micro-programming, sequence control and interrupt arrangement.

5. *Peripheral and data communications equipment:* card and paper tape equipment.
Mark sensing and character recognition.
The principles of data transmission, and of graphical input and output; keyboards and printing devices.

6. *Maintenance and fault diagnostics:* simple diagnostic and test programs. Failure mechanisms in electronic, electrical and mechanical devices. Preventive maintenance.

OPTION B

Programming

1. *Practical programming*

Detailed knowledge of:

either a basic computer language *or* an assembly language: and *either* a business oriented *or* a scientific language: and diagnostic aids and a library of programs and specifications: Functions and characteristics of an elementary operating system.

2. *Processor organization*

Time sharing
Interrupt systems
Multi-programming
On-line interactive systems

3. *Principles of programming*

Instructions and data structure: word and byte organizations, addressing methods. Fixed, floating-point and multiple precision arithmetic. Arrays, fixed and variable length fields and records; file structure, serial and direct access techniques for files; sorting/merging techniques.
Systems configurations; interrupts; multi-programming; multi-processors.

Multi-access; time-sharing; conversational modes.
Operating systems; assemblers; compilers; monitors; schedulers.
Hardware/software relationships.
Techniques used in compilers etc., macros.
List processing and list-processing languages.

OPTION C

Data Processing

1. *File processing*

a) Representation and organization of data in the computer system, files and records, activity levels, fixed and variable format, methods of data storage, the use of different types of storage.

b) Overall design features of program suites;
Consideration of the requirements needed for operating and maintaining the programs, with attention being given to restarts, reconciliations and recovery.
Program and procedure testing, design of test data.

c) The case for procedure oriented languages for data processing;
Techniques for file manipulation, sorting, sort generators, report program generators, control of input and output format.

d) Program and systems documentation; decision tables and flow charts.

2. *Data handling techniques*

a) Unit record equipment, accounting machines, punch card systems, paper handling equipment, graphical techniques, remote terminals (on-line and off-line), data preparation and verification equipment.

b) Data capture and data transmission;
Error detection, correction and system recovery, comparison of problems in real-time and batch systems.

3. *Applications*

A choice of one topic from the following list:

a) Commercial data processing; *eg* financial and costing systems, scheduling and management information systems.

b) Information storage and retrieval; *eg* indexing and cataloguing, diagnosis.

c) Technical data processing; *eg* interactive systems, model building.

d) Social studies; *eg* surveys, censuses, urban planning, textual analysis.

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calendar

July 22-26, Princeton, N.J. – "Digital Computation." Contact: Electronic Associates, Inc., P.O. Box 582, Princeton, N.J.

Aug. 5, Edinburgh, Scotland – IFIPS Congress 68. Contact: AFIPS, 345 E. 47th St., New York, N.Y. 10017.

Aug. 12-16, Boston, Mass. – "Computer Evaluation and Selection." Contact: R.F. McIntosh, Computer Learning, 6201 Leesburg Pike, Falls, Church, Va. 22044.

Aug. 22-23, Boston, Mass. – "Pert-CPM and Network Analysis." Contact: Special Studies Institute, Management Seminar Programs, 122 E. 42nd St., New York, N.Y. 10017.

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Banking or Commercial capability. Utilizes: IBM 1240 – 8K; written in Autocoder/IOCS. Produces full cycle of edit, posting, delinquency, collection, and management reports. Fast processing, tight dollar control and thorough internal and external documentation. Fully operational for 1 year.

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COBOL CROSSREF

Single program produces a cross reference by page/line, or compiler sequence, of all file, data, and procedure names contained in a COBOL source deck. Designed for S/360 DOS 32K and up. Send for full details.
Price: $120

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Capabilities include: up to six lines/chart; individual scale and labels for each line; logarithmic or linear plot; chart sequencing and titling; user selection of plot symbols; scatter plots or connected line plots; comprehensive diagnostics; no destruction of data.

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Division of KMS Industries, Inc.
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AUTOFLOW ®

An automatic flowcharting system that produces 2 dimensional flowcharts directly from Cobol, Fortran and assembly language input.

Autoflow also produces listings of syntax errors, logic errors, data-name cross reference, label (or paragraph or statement number) cross reference index, and alphanumeric label index. Available for: IBM 360 systems, H-200 systems, Spectra 70 systems, IBM 1400 and 7090 systems. Write for literature and free demonstration.

Price: Upon request
Contact: Applied Data Research

Route 206 Center
Princeton, N.J. 08540

Sort Merge Routine for IBM 1130

Variable field alpha-meric sorting with limits only for what your disk will hold. Extremely fast and callable by any program. True General Purpose.

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9861 Cockatoo Lane
Garden Grove, Calif. 92641

360 DOS Date Routine

Program gives user Alpha, Short, and Julian dates. Uses either system date or user specified date. Ideal for all DOS languages (COBOL, RPG, PL/I, ALC and FORTRAN).
Price: $150.00
Contact: Perry L. Fleeman
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Lubbock Texas 79408
(806) 765-7761

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– 100% COBOL –

Series of 23 programs which process hourly and salaried payrolls in a multi-company environment. Liberal deduction capabilities. Full labor distribution reporting. Complete file maintenance facilities. Excellent documentation. Runs on IBM 360 with 32K and two 2311 Disk Drives. This system is now being used and has proven highly successful. Price: $5,000
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Mod 4, Ready '69, Runs 20 Programs

WELLESLEY HILLS, Mass. – Honeywell has announced details of its new operating system designed for the Honeywell 4200 – the largest single processor system in the Series 200. The 4200 is due for its first customer delivery in August, and the software, called the Mod 4 operating system, is expected to be demonstrable in December, with deliveries timed for the first quarter, 1969.

Design Goals

The design goals for the software are the maximization of throughput and computer resource (core, peripherals, and time) usage, configuration flexibility, modularity, and simplicity of use. Nominally, it is rated with the capability of running 20 programs at a time, but the actual capacity will not be known until more experience has been gained. "Programs" in this context are actually equated to "tasks" with a specific job being broken down into a number of tasks, such as input reading, job execution, and output reading. It is expected that this will provide for high resource allocation, with the various resources being allocated according to flexible priority methods by the user based upon his experience.

Generation Sets

The core can be broken up into 20 different areas, or "sets" by the use of installation parameters at system generation time, which would normally be only every two months or so.

The sets then remain fixed, although specific "sets" also can be broken down into two partitions if necessary. During generation the scheduling method to be used is decided and, in general, high priority programs, such as real-time or communications, are allocated into linear scheduling areas, while the remainder are placed in round robin areas.

In round robin operation, after an interrupt is processed, control is returned not to the program which was interrupted, but to the next program in the queue. In linear scheduling, a single program retains control until it is either bumped by a higher priority program or until it can go no further. The decision as to whether linear or round robin scheduling – or a combination of both – is to be used is made at system generation and initiation time and is handled on the basis of what area of core is being utilized by the program.

Priorities Set

Actual program priorities are set at run time, with four classes available. Because the scheduling decision has already been made, the priority determines the place of the job in the loading process, rather than in operation once loaded. Top priority therefore provides the program with top place on the queue, ready to be loaded just as soon as there are enough resources available (printers, punches, etc., and core space). It also prevents any resources from being allocated to any other program or any new program in the particular program class (there can be up to 10 program classes set up by an installation) from being initiated. The lowest priority is a "hold,　do not run this job until its status is changed."

Memory Protection

The memory protection system is hardware based, and consists of checking the addresses created by a program both before and after (to prevent re-complementation errors) that have been passed through the relocation registers.

A minimum Model 4200 configuration for use with the Mod 4 operating system would be a central processor with 131,072 characters of main memory, six magnetic tape drives, two disk drives, a line printer, a console, and a card reader/punch. This system would rent for about $30,000 per month, or sell for approximately $1,100,000.

A typical system would have considerably more core (perhaps double), one or more extra printers, more tape units, etc.

DOS Release 17 Available; Users Still Adjusting to Release 16

NEW YORK – Release 17 of the IBM Disk Operating System has been distributed and is currently being generated in systems across the nation. (The system changes are shown in Figure 1.)

Meanwhile, users of the earlier Release 16 – which was the first Version III release – still were becoming familiar with some of the changes involved in it as they gained more experience. Some of these changes involved elements which apparently had been altered unexpectedly. One was the ability to use 132 print positions in Fortran write statements, which unexpectedly was cut back to 120. Others involved difficulties which occurred as a result of improvements. One such case was fixing of the Fortran object time dump situation. Previously it had been impossible to get a dump when a Fortran program ended

abnormally, but, thanks to Common intervention, this was fixed in Release 16. However, in checking out the system, it appears that in some cases the registers printed on the dump are not the ones needed – so some further action presumably will be needed.

Changes in Release 17 of DOS

Inclusion of a high speed assembler, Assembler F, which saves up to 45% of the time involved in the use of Assembler D.

Improved handling of indexed sequential operations.

Minor changes in telecommunications, Cobol, and sorts.

Generation time 3/4 hour to 1.5 hours depending upon the amount of tailoring required.

Figure 1

COMPUTERWORLD financial

Sunasco's Proposed Buys Among Recent Mergers

PHILADELPHIA, Pa. – Sunasco, Inc. has announced the acquisition in principle of three companies.

To be acquired are International Data Products Co. in Cleveland, Ohio, in exchange for approximately 100,000 shares of Sunasco common stock; Nuclear Associates International Corp. in Rockville, Md., for an initial 20,000 shares of Sunasco stock and up to an additional $1.6 million in Sunasco common stock during a five year period contingent on Nuclear's earnings; and the Analog and Hybrid Computer Division of Westec's Geo Space Corp. in Houston, Texas, on undisclosed terms.

According to Sunasco President, Thomas T. Flemming, International Data Products will become part of Sunasco's Finance Group, and "will be the marketing arm for computer software-hardware leasing packages."

Nuclear Associates develops computer programs and systems used to determine nuclear fuel utilization of atomic reactors operated by public utilities.

The Analog and Hybrid Computer Division makes systems for combining analog and digital computers.

Westec, a natural resources and geophysical instruments concern, has been in financial collapse since 1966. A court-appointed trustee is reorganizing the company and its former officers are being tried in federal court in Houston on charges of conspiring to file "false and fraudulent" financial reports about the company.

Computer Research Agrees To Buy Scan Data Centers

PITTSBURGH, Pa. – Computer Research, Inc., an affiliate of National Industries in Louisville, Ky., has agreed in principle to acquire Scan Data Centers, Inc. in Chicago, Ill., for an undisclosed number of shares and warrants.

Scan Data will continue to operate under its founder, Paul A. Larsen, according to CR President E.O. Nemitz.

Acquisitions

Scan Data operates an optical scanning input/output company, as well as a data processing center and a temporary-help service specializing in computer operating personnel.

Scan Data, which is planning to franchise its operations in principal cities, also has organized a program specifically designed for the graphic arts industry.

Digitek Corp to Acquire Marina Research, Inc.

LOS ANGELES, Calif. – Digitek Corp., a computer software company, has agreed in principle to acquire Marina Research, Inc. in Huntington Beach, an engineering, research, and development firm, for an undisclosed amount of stock.

The firm will be acquired on a pooling of interests basis and operated as a subsidiary under the direction of its president and cofounder, Leonard J. Genest, Digitek announced.

The year-old Marina Research, which last year had sales of $100,000, is engaged in the development of proprietary new products to be licensed to independent manufacturers. The company also performs product development services on a contract basis.

Granite Equipment Leasing Acquires Omni Computer

GARDEN CITY, N.Y. – Granite Equipment Leasing Corp. has acquired Omni Computer Systems, Inc., New York, for an undisclosed amount of stock. Omni is a computer consulting and software services organization.

Granite and its subsidiaries lease third generation computers and other data processing equipment, and furnish a broad range of data processing services.

S&P Plans 'Familiar Term' Time Sharing Language

NEW YORK – Standard and Poor's plans to introduce a time sharing computer language this fall that will make it possible for security analysts to use remote terminals.

Penny Kaniclides, vice president in charge of S&P's Computer Division, sits at the console of the CDC 6400 computer the company has just installed.

The new language – to be known as Final (financial analysis language) – will allow security analysts and others to use familiar terms to communicate and interact with a Control Data 6400 computer that the company has installed. The language will be the most versatile and powerful produced in this area, according to S&P.

"This ushers in the era of time sharing, not only for research, but also for back office work," said S&P President H. Russell Morrison.

Wall Street brokerage houses have been so inundated with paperwork because of the sustained high volume of sales recently, that the New York stock exchanges temporarily have gone onto four-day selling weeks to allow the back offices to catch up.

S&P now maintains the world's largest data base of corporate and financial information for computer use. The data base, called Compustat, covers 1800 industrial companies, 100 utilities, 100 insurance companies, and 400 Canadian firms.

The Final information retrieval program will allow a financial or security analyst to access the Compustat data base via a planned network of remote terminals without learning computer language or technology.

S&P said it anticipates offering remote access to its new computer sometime this year through a system known as Respond, an interim means of communications until Final is introduced. Respond will employ Fortran or Cobol as its language, and will enable the subscriber to write programs of his own or to call on stored programs, Morrison said.

Mohawk to Buy 2 Companies for $10M

HERKIMER, N.Y. – Mohawk Data Sciences Corp. has signed agreements to acquire the operations of Ohr-Tronics, Inc. in Montvale, N.J., and the H.M. Storms Co. in Brooklyn for a total price of approximately $10 million in Mohawk common stock.

Mohawk Vice President, Richard P. Rifenburgh, said in June that the company was planning to acquire one or two small companies before the end of the year to broaden its product line.

In May, Mohawk acquired Soroban Engineering, Inc., a company that makes paper tape punchers and readers.

Mohawk has also announced that a registration statement covering approximately 138,000 shares of common stock, including shares to be issued in connection with the foregoing acquisitions, and shares to be offered by certain Mohawk stockholders, has been filed with the Securities and Exchange Commission. Included among such stockholders are holders of convertible subordinated notes and common stock purchase warrants of Soroban Engineering; A.G. Baker & Co., Inc. (and certain of its present and former stockholders); and Midland Capital Corp.

Ohr-Tronics, formed to develop data processing equipment for use in retail, garment, and textile industries, manufactures a line of paper tape equipment. It also has developed the System 80, a line of equipment utilizing detachable perforated tags for use in inventory, piecework, payroll, and general business applications.

Computer Stocks Trading Index

——— Computer Systems   ‑‑‑‑‑ Software & EDP Services
········· Peripherals & Subsystems   ········ Leasing Companies
——— Supplies & Accessories   ‑·‑·‑ CW Composite Index

Chart: vertical axis 50–250; horizontal axis weeks 1 8 15 22 29 | 5 12 19 26 | 3 10 17 24 31 | 7 14 21 28 | 5 12 19 26 across MARCH APRIL MAY JUNE JULY.
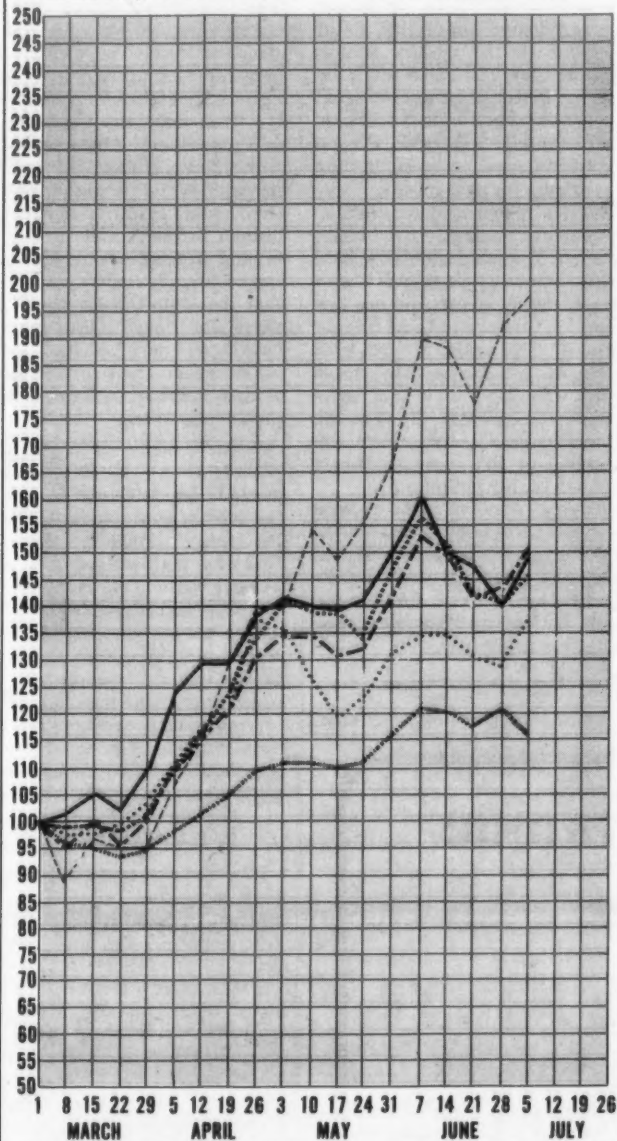
CW Stock Index Up 8.17%, D-J Average Up 6.7%

(Continued from Page 1)

943 than it was in early June when some analysts were predicting it would.

In the Computer Systems sector, Raytheon closed down 7.44% at 42 following a two-for-one split. Scientific Data, which closed down the previous week, closed up 10.55% at 102-1/8, beaten in gains in the sector only by Digital Equipment, which closed up 10.81% at 144-3/4.

The Peripherals and Subsystems sector closed up, possibly in reaction to the Federal Communications Commission's June 27 decision that opened the way for the use of data communications equipment made by independent companies on telephone company lines. Alphanumeric continued its up and down cycle, this week closing up 9.23% at 71. Addressograph-Multigraph was up 11.32% to 87-1/2 while Information Displays closed off 8.51% at 21-1/2.

In the Supplies and Accessories sector, Memorex, after its third week on the New York Stock Exchange, closed up 13.42% at 77-1/8. Moore Business Forms closed down 8.13% at 28-1/4.

In the Software and EDP Services sector, Scan-Data took its second consecutive big loss, closing off 11.11% at 80. National Computer Analysts was up 13.25% to 47 and Computer Network was up 13.21% to 60. TBS Computing Centers closed up 4.26% at 12-1/4, but the stock remained far below its March 1 base price of 20-1/2.

In the Leasing sector, Computer Exchange was up 16.13%, closing at 9, a new high for the year. Leasco also reached a new high, closing up 16.45% at 97. Dearborn Computer matched an earlier high, closing up 8.05% at 47. Among the stocks off was Lectro Computer Leasing, which closed down 6.82% at 11-3/4.

COMPUTER STOCKS: TRADING SUMMARY

WEEK ENDING JULY 5, 1968

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	COMPUTER SYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	163 3/8	220–157	201	• Burroughs	+ 1/2	+ 0.25	+ 23.03
NYSE	67 3/4	110– 65	62 1/2	Collins Radio	– 3	– 4.58	– 7.75
NYSE	101 1/2	174– 95	161	• Control Data	+ 12 3/4	+ 8.60	+ 58.62
AMSE	102	160– 95	144 3/4	• Digital Equipment	+ 14 1/8	+10.81	+ 41.91
NYSE	87 1/4	100– 84	85 1/2	General Electric	– 3/4	– 0.87	– 2.01
NYSE	80	91– 59	80 1/2	Hewlett-Packard	– 1/4	– 0.31	+ 34.17
NYSE	93 1/8	144– 85	130	Honeywell	+ 4 1/4	+ 3.38	+ 41.11
NYSE	298 1/2	375–290	398	IBM	+ 4 1/4	+ 1.20	+ 34.00
NYSE	103 7/8	163– 90	136 3/8	Nat. Cash Register	+ 5/8	+ 4.80	+ 31.29
NYSE	48 7/8	85– 45	47 3/8	RCA	+ 1/2	+ 1.07	+ 1.07
NYSE	39 1/8	53– 36	42	Raytheon	– 3 3/8	– 7.44	+ 7.36
OTC	22 1/2	68– 20	49	• Scientific Controls Corp.	– 3	– 5.76	+117.78
NYSE	78 3/4	114– 72	102 1/8	• Scientific Data	+ 9 3/4	+10.55	+ 29.68
NYSE	45	63– 42	51	• Sperry Rand	+ 1 1/8	+ 2.26	+ 13.33
AMSE	22 1/2	39– 20	38 3/8	• Systems Engineering Labs.	+ 1 3/4	+ 4.78	+ 70.56

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	PERIPHERALS & SUBSYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	56 3/8	91– 52	87 1/2	Addressograph-Multigraph	+ 8 7/8	+ 11.32	+ 48.89
OTC	21	85– 45	71	Alphanumeric	+ 6	+ 9.23	+236.10
NYSE	29	37– 29	32 7/8	Ampex	+ 1 1/4	+ 3.95	+ 13.36
OTC	17 1/4	27– 16	18 1/4	Bolt Beranek & Newman, Inc.	– 1/2	– 2.70	+ 5.80
NYSE	13 1/2	20– 12	18 1/2	Bunker-Ramo	– 1/8	– 0.67	+ 37.04
AMSE	32 1/8	50– 27	48 1/4	• Calcomp	+ 3	+ 6.63	+ 50.20
OTC	12	17– 10	16 1/4	Computer Equipment	—	—	+ 35.42
OTC	15 1/4	22– 13	19 5/8	• Data Products	+ 3/8	+ 1.95	+ 28.68
OTC	19 1/4	27– 16	21	• Digitronics	+ 1/2	+ 2.44	+ 9.09
OTC	39	57– 32	42	• Electronic Memories	– 1 1/4	– 2.89	+ 7.69
OTC	10	20– 9	17	• Fabri-Tek	+ 5/8	+ 3.82	+ 70.00
OTC	34	71– 28	64	Gerber Scientific	+ 1	+ 1.59	+ 88.24
OTC	12 1/2	24– 10	21 1/2	• Information Displays	– 2	– 8.51	+ 72.00
AMSE	16 7/8	52– 14	50 3/4	Milgo Electronics	+ 4	+ 8.58	+300.74
AMSE	115 1/8	217–108	208	• Mohawk Data Sciences	+10 1/2	+ 6.61	+ 80.67
OTC	74	138– 71	117	• Optical Scanning Corp.	– 3	– 2.50	+ 58.11
OTC	72	125– 64	111	Photon	– 1	– 0.90	+ 54.17
AMSE	25 5/8	38– 20	33 1/2	• Potter Instrument	+ 1 3/4	+ 5.51	+ 30.73
OTC	40 1/4	93– 38	80 1/2	• Recognition Equipment Corp.	+ 3 1/2	+ 4.56	+100.00
AMSE	16	29– 14	24 3/4	Rixon Electronics	– 1 1/4	– 4.80	+ 54.69
NYSE	46 1/8	66– 42	55 1/2	Sanders	+ 1 1/4	+ 2.30	+ 20.33
OTC	40 1/2	51– 36	45 1/2	• Tally Corp.	– 2 1/2	– 5.21	+ 12.36
NYSE	242 1/4	321–229	301	Xerox	+ 4	+ 1.35	+ 24.25

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SUPPLIES & ACCESSORIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	48 1/2	64– 41	54 1/2	• Acme Visible	+ 2	+ 3.81	+ 12.73
NYSE	20 1/2	32– 19	26	Adams-Millis	+ 3/8	+ 1.46	+ 26.83
OTC	13 5/8	19– 13	19 5/8	• Baltimore Business Forms	+ 1/2	+ 2.61	+ 44.04
AMSE	27	44– 21	39 3/4	• Barry Wright	+ 3/4	+ 1.92	+ 47.22
OTC	31 1/4	26– 40	37 3/4	Data Documents	– 1/2	– 1.31	+ 20.80
OTC	27 1/4	38– 26	33 1/2	• Ennis Business Forms	– 1	– 2.89	+ 22.93
NYSE	84 1/8	119– 81	109	• 3M Company	+ 3	+ 2.83	+ 29.60
NYSE	68	83– 49	77 1/8	• Memorex	+ 9 1/8	+13.42	+ 32.97
OTC	27 1/4	32– 25	28 1/4	• Moore Business Forms	– 2 1/2	– 8.13	+ 3.66
NYSE	57 1/4	71– 47	69 5/8	Nashua Corp.	+ 1/8	+ 0.18	+ 21.61
OTC	31 1/4	50– 30	50	Reynolds & Reynolds	+ 2 1/2	+ 5.26	+ 60.00
OTC	34 1/2	35– 24	24 3/4	• Standard Register	– 1 1/2	– 8.06	– 18.26
NYSE	37 3/4	44– 30	32 1/8	• Uarco	– 7/8	– 2.72	– 14.91
AMSE	14 1/4	22– 13	17 3/8	Wabash Magnetics	+ 1/4	+ 1.44	+ 21.92
OTC	25 3/4	36– 24	29 1/2	• Wallace Business Forms	– 1	– 3.26	+ 14.56

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SOFTWARE & EDP SERVICES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	7 1/2	22– 7	18 3/4	• Advanced Computer Techniques	+ 1/4	+ 1.35	+150.00
OTC	17	32– 14	27	• Applied Data Research	—	—	+ 58.82
OTC	15 1/2	24– 15	18	• Aries	– 1/4	– 1.37	+ 16.13
AMSE	47	66– 43	55 3/4	Automatic Data Processing	+ 1/4	+ 0.45	+ 18.61
OTC	4 1/2	18– 2	18	• Brandon Applied Systems	—	—	+300.00
AMSE	22 7/8	43– 21	25 7/8	• Computer Applications	+ 2 1/8	+ 8.95	+ 13.11
OTC	5	13– 7	11 1/2	• Computer Environments	– 1/2	– 4.17	+ 48.36
OTC	30	60– 24	60	• Computer Network	+ 7	+13.21	+100.00
AMSE	40	64– 38	61 1/2	• Computer Sciences	+ 6 1/2	+11.82	+ 53.75
OTC	39	62– 35	39 1/2	• Computer Usage	– 3	– 7.06	+ 1.28
AMSE	36 1/2	61– 36	53 1/2	• Computing and Software	+ 2 1/2	+ 4.90	+ 46.57
OTC	12 1/2	20– 9	13 3/4	• Digitek	– 3/4	– 5.17	+ 10.00
AMSE	39 3/8	52– 26	39 5/8	Electronic Computer Prog. Inst.	+ 2 7/8	+ 7.82	+ 3.26
OTC	35	68– 32	61	• Informatics	– 4	– 6.16	+ 74.28
OTC	21	28– 17	18 1/2	Matrix Corp.	– 1	– 5.13	– 11.91
OTC	11 1/2	47– 8	47	• National Computer Analysts	+ 5 1/2	+13.25	+308.70
AMSE	31	45– 28	41	Planning Research	+ 2 1/2	+ 6.49	+ 32.26
OTC	47	155– 63	80	• Scan-Data	–10	–11.11	+ 70.21
OTC	9	15– 8	13	• Software Systems	+ 1/2	+ 4.00	+ 44.44
OTC	20 1/2	22– 12	12 1/4	• TBS Computing Centers, Inc.	+ 1/2	+ 4.26	– 50.00
OTC	63	158– 57	137	• University Computing	+ 6	+ 4.58	+112.10

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	LEASING COMPANIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	19	64– 18	52 1/2	Booths Computer	– 1 1/2	– 2.77	+191.67
OTC	19 1/4	25– 19	26 3/4	Chandler Leasing	—	—	+ 38.96
OTC	4 1/8	9– 4	9	Computer Exchange	+ 1 1/4	+16.13	+111.76
AMSE	29 1/8	36– 21	29 5/8	• Computer Leasing	+ 1 3/4	+ 6.30	+ 17.91
OTC	12 1/2	19– 11	18 1/8	• Cyber-Tronics	+ 1 1/8	+ 6.62	+ 31.63
AMSE	106 5/8	194– 94	132 3/8	• Data Proc. Financial & General	+ 1 1/2	+ 1.15	+ 24.15
OTC	12 1/2	17– 9	9 3/4	Detronic Rental	– 1/4	– 2.50	– 22.00
OTC	20	64– 19	47	• Dearborn Computer	+ 3 1/2	+ 8.05	+135.00
OTC	13 1/4	19– 12	18 1/2	• DPA, Inc.	+ 1 5/8	+ 9.63	+ 39.62
AMSE	28 3/4	43– 27	38 1/2	• Greyhound Computer	+ 3	+ 8.45	+ 33.91
AMSE	39 1/8	60– 36	42	Granite Equipment Leasing	– 1/8	– 1.09	+ 7.10
AMSE	49	97– 46	97	• Leasco	+ 11 1/2	+13.45	+ 97.96
OTC	5	14– 4	11 3/4	Lectro Computer Leasing	– 3/4	– 6.82	+135.00
AMSE	49 7/8	66– 41	63 3/4	• Levin-Townsend Computer Corp.	+ 6 1/8	+10.74	+ 52.50
OTC	19 1/2	16– 7	10 1/4	LMC Data, Inc.	– 1/2	– 4.65	– 2.50
OTC	10 7/8		11	• Management Assistance	+ 3/8	+ 3.53	+ 1.15
AMSE	41 5/8	53– 25	43 1/2	National Equip. Rental	– 1/4	– 0.57	+ 4.50
AMSE	38	64– 30	54 1/4	• Randolph Computer Corp.	+ 4 1/2	+ 9.09	+ 43.42
OTC	16 1/2	42– 10	32 1/2	System Capital Corp.	+ 1/2	+ 1.90	+209.52
AMSE	10 7/8	19– 10	16 5/8	U.S. Leasing	+ 3/4	+ 4.72	+ 52.87

* Stock split   **Not available   •Companies included in Computerworld's stock trading index for each sector.

'Two Years Experience'; Is It a Valid Criterion?

By Neal Wilder

Gaps are very big now. There are Credibility Gaps, and Generation Gaps, and in EDP we have an Experience Gap.

Even a cursory examination of EDP recruitment ads shows one almost universal requirement; everyone wants people with "a minimum of two years' experience." The question is: where is everyone going to get people with two years' experience? The answer so far seems to have been . . . lure them away from someone else.

Luring experienced people from the competition, or elsewhere in an industry, is indeed a time-honored method of solving the personnel problem. Industries have been using this approach since emerging from the cottage. But these same industries have found that in many cases a "lured" employee is really nothing more than an employee who is "lurable" by someone else.

This same problem of "lured" and "lurable" employees is now very much the problem in EDP. At any point in time, there are about 50,000 more jobs in EDP than there are people to fill them. The potential employee then —

that man with the famous two years of experience — is a man or a woman, with a very marketable commodity in his or her hands. These persons can go just about anywhere in the country, stay as long as they wish, and when the moving mood strikes, move again to a new area for more money than the last job paid. What a wonderful spot to be in, trading experience for paid travel!

What a rough spot for the employment manager to be in, though. His job is to fill a need with someone he's going to have to pay dearly to get, and in a few months, turn around and fill that need all over again. Maybe, with luck, he can hire a few people who will stick with that company, who will like the area, the fringe benefits, the other employees, or the company future enough to stay put. Maybe.

Anyone who can come up with one succinct, easy to understand solution to this problem will earn himself a great deal of money. We don't have that one simple solution, but we can offer one suggestion that might help.

Untapped Resource

Programming schools all over

the country are turning out thousands of "graduates" every day. What happens to them? Placement directors make all kinds of claims, and point with understandable pride to former students now gainfully employed at various computer installations, but what about the great mass of the graduates? That poor kid from the mailroom who paid his money (several thousands of dollars in some cases), tried to better himself in the American Way by pulling himself up by his bootstraps, found out after graduation that he didn't have the "two years' experience" (how could he have?), and now he's back in the mailroom — poorer, disillusioned, and lost to the computer industry forever.

Granted many of these EDP schools are not all they are supposed to be, that some don't have the type of equipment claimed in the fancy brochure, that the "hands on" experience just doesn't exist. Yet, many are attempting to train, many are graduating people who could be absorbed, who could fill the needs of the industry, people who because they don't have the necessary experience, or because they didn't "practically invent Cobol" are back in the mailroom or selling real estate.

Help Them to Help You

Why not give these people with little more than potential an opportunity? Not just as operators who hopefully can learn enough from a programmer to "fake it" on their next interview, but hire them right from the start in a position where they can learn properly from the more experienced people. Call the jobs whatever you will — junior assistant programmer, beginner programmer. The title is not the important thing. The job is.

On the job training is one of those much trampled expressions. The trampling, though, is done more by those offering it than those taking it. Professional selection can bring a company those people willing to learn. And let's face it, the computer industry is the "hot" industry now. A whole raft of people are dying to get involved in it. The problem is not one of selling the industry to the applicant. The problem is to select applicants who may not have the experience, but who do have the desire, and the capacity to learn.

One partial solution to the EDP Experience Gap is for managements not just to take the path of luring the experienced, not just to sit and decry the bad schools and to hire all but a few from the very best, but to make provisions within their own installations for people with some schooling to be trained on the job by the experienced so that they can step quickly into The Gap and ease the personnel pinch.

Who knows — perhaps such a trainee will realize his career potential right there and appreciate the moves that company made to hire and train him so that when the famous two years are up, he may stay put and resist the lures to sunnier climes.

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Ohio University has openings in Administrative Data Processing for System Analysts and Programmers who are interested in a wide variety of experiences. The University has an IBM System/360 Model 40 with disks and tapes which is used for financial, business and student record applications.

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Firm Enters Hardware Field With Tiny Computer

MOUNTAIN VIEW, Calif. — A small, $6600 computer system with a claimed 17,000-hour Mean Time Between Failures (and that's nearly two years!) is being offered by a logic card manufacturer, Data Technology Corp.

The DT-1600 system has an unusually small memory size — 4K or 8K bits — and small weight, 28 lbs. It uses an 8 microsecond core, and high threshold level circuits to establish high noise rejection, and ease critical pulse timing problems when communicating with peripherals.

The automatic power failure sequence provides for a controlled shut-down and an automatic start-up when power returns.

Data Technology DT-1600 Computer

Sample Kit of Captive Floating Nuts Offered

Some news releases are dull, some are interesting — and some are downright startling.

Utility Will Offer Time Sharing Plan

WILLOW GROVE, Pa. — Philco-Ford's Computer Services Network is joining the time sharing services boom. The network, which serves the eastern seaboard, will have the new service fully implemented by January, the company said.

To increase the center's data storage facilities, a disk memory with a capacity of 52 million characters will be added.

The center uses a small, Philco-Ford 102 computer to operate the network and to feed a large, Philco-Ford 212 computer, which does the computational work. In the future, both machines will share the 330,000 character memory now used by the Model 212.

The headline above was on a news release that came to *Computerworld* last week, and we thought it was just too good to keep to ourselves.

The headline, by the way, refers to a type of fastener called a Pressert Floating Nut made by the Precision Metal Products Co. of Stoneham, Mass. The nuts are used in assembling chassis.

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DEC Offers New Models, Cuts Prices

Price Reductions

The price reductions on additional PDP-8/I computer peripherals ranged as high as 50%. These include a memory expansion module to increase the system's core from the basic 4K to 8K (cut from $5000 to $3500), the 8K to 16K expansion module with parity (cut from $14,400 to $11,000), and the memory parity control, cut 50% (from $2000 to $1000).

George L. Rice, marketing manager for the PDP-8/I, attributed the reductions to the use of integrated circuits and large scale production brought about by increased demand for the products.

ADR Lease Rates

Meanwhile, Applied Data Research has established rates for its leasing to others of PDP 8/S and PDP 8/I computers.

ADR is not serving as a leasing agent for Digital Equipment, the manufacturer, but is leasing 8/Ss for $480 a month, including maintenance, and 8/Is for $660 a month, including maintenance.

Software is available when leasing either model. Similarly, they can be leased at an additional cost in connection with proprietary software programs developed by ADR. The company has developed several such programs including ESI (Engineering and Scientific Interpreter) which was designed specifically for use with smaller computers. ESI enables users with little computer experience or training to work directly with computers.

Canned Software Not 'Dirty Word,' CPAs Are Told

DAYTON, Ohio — Accountants were urged to "look again" at packaged computer programs by Larry Bertsch, an NCR CPA who acknowledged that in many cases the very name "packaged program" was thought of as a dirty word.

The objections to packaged programs came from a lack of mutual understanding between the client and the computer industry as to exactly what the program was, he said. On the one hand he blamed the users for failing "to fully understand the significance of the services, so they applied their own interpretation." At the same time, he said, the computer industry had simply "run from" the term packaged programs rather than accepting its responsibility to make sure that the operation of the system was fully understood.

From an accountant's point of view, Bertsch argued that there are virtues — such as economy, debugged programs — in the use of packaged programs themselves. But his main thrust was that by using them for accounting applications, accounts receivable, accounts payable, and payroll, a user can get a fast return on invest...